
Postnatal deletion of Numb/Numbl like reveals repair and remodeling capacity in the subventricular neurogenic niche.

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Public Summary:

Scientific Abstract:

Neural stem cells are retained in the postnatal subventricular zone (SVZ), a specialized neurogenic niche with unique cytoarchitecture and cell-cell contacts. Although the SVZ stem cells continuously regenerate, how they and the niche respond to local changes is unclear. Here we generated nestin-creER(tm) transgenic mice with inducible Cre recombinase in the SVZ and removed Numb/Numbl like, key regulators of embryonic neurogenesis from postnatal SVZ progenitors and ependymal cells. This resulted in severe damage to brain lateral ventricle integrity and identified roles for Numb/Numbl like in regulating ependymal wall integrity and SVZ neuroblast survival. Surprisingly, the ventricular damage was eventually repaired: SVZ reconstitution and ventricular wall remodeling were mediated by progenitors that escaped Numb deletion. Our results show a self-repair mechanism in the mammalian brain and may have implications for both niche plasticity in other areas of stem cell biology and the therapeutic use of neural stem cells in neurodegenerative diseases.

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